



Chlorolab 2

**Advanced system for the study
of photosynthesis & respiration**

- ✓ Convenient, system for the advanced study of photosynthesis & respiration measurements in liquid-phase samples under illumination
- ✓ DW2/2 liquid-phase electrode unit with integral oxygen electrode
- ✓ OxyLab unit for direct PC control and data acquisition
- ✓ Sample mixing by integral stirrer driving a magnetic follower
- ✓ 4 optical ports for illumination via LED1/W high intensity white LED probes
- ✓ Quantitherm light/temperature sensor for light calibration
- ✓ System calibration & control via Windows® Software



Hansatech Instruments

Hansatech Instruments is a small, British, scientific instrument company located in the heart of rural Norfolk. For over 40 years, our efforts have been concentrated towards the design & manufacture of high quality instrumentation for teaching and research in the fields of cellular respiration and photosynthesis. Our instruments are now in use in a wide range of programs in more than 100 countries throughout the world and have gained an enviable reputation for quality, reliability and excellent price/performance.



Products

Hansatech Instruments product range covers a wide range of applications in the fields of photosynthesis and cellular respiration. We manufacture oxygen measurement systems based on Clark type polarographic oxygen sensors, chlorophyll fluorescence measurement systems for both continuous excitation and pulse-modulated measurement techniques and optical instrumentation for the measurement of sample chlorophyll content.



Support

Purchasers of Hansatech Instruments products can be assured of ongoing support and prompt and efficient attention to enquiries at all times. Customers are encouraged to register their instruments on our website which allows access to our Support Ticketing System in addition to instruments manuals and software upgrades.



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Hansatech
Instruments

Overview

Chlorolab 2 provides a sophisticated system for the advanced study of respiration and photosynthesis from liquid samples under automated illumination. The system is supplied as standard with a white light source (LED1/W) but may be supplied with a blue (LED1/B - 470nm) or red (LED1/R - 627nm) light source depending on the proposed application. The system provides the ability to automate the acquisition of oxygen evolution/uptake rate over a user-defined light intensity rate and to determine the apparent quantum yield. The system is ideally suited to busy research facilities where demands on equipment performance are high but is equally at home in teaching environments for under & post-grad plant biology studies of the photosynthetic processes.

Samples are typically between 0.2 – 2.5ml and consist of suspensions of extracted chloroplasts, micro-algae etc. Changes in oxygen concentration of the sample medium are determined by the integral oxygen electrode mounted in the base of the chamber. The system comprises the Oxylab control unit, S1 Clark type electrode disc, DW2/2 liquid-phase electrode chamber, LED1/W light source and QRT PAR/temperature sensor for light source calibration. All necessary accessories and spares are also included (excluding circulating water bath and PC).

The Oxylab oxygen electrode control unit operates in conjunction with the user-friendly O₂view data acquisition and system control software to provide PC control of oxygen uptake or evolution measurements from the S1 Clark type oxygen electrode. Oxylab may be employed to function effectively across a broad range of applications from studies of mitochondrial and cellular respiration to measurements of isolated chloroplast suspensions or solid state leaf samples in photosynthesis research depending on the type of electrode chamber used. Up to 2 individual Oxylab control units may be connected to a PC providing a convenient method of comparing signals from 2 channels simultaneously. Additionally, Oxylab may be configured to accept an optional auxiliary input signal (e.g. temperature, pH, chlorophyll fluorescence, TPP+ or other specific ion electrodes etc) using the appropriate accessory apparatus therefore extending the flexibility of the system.

Oxylab provides automation of complex light intensity changes during light response assays in conjunction with the LED1 light source. Light tables (or photon flux density tables) are created within the O₂view software via a user-friendly interface. The Oxylab control unit connects to the serial port of a Windows® PC either directly or using a HAN/USB adapter (for newer PC's with no serial ports). The control unit features a built-in magnetic stirrer and all the electronics required to control and measure the signal from the S1 oxygen electrode disc.

O₂view Windows® software controls all major hardware and data acquisition functions including signal gain and back-off and simple calibration routines for both liquid and gas-phase measurements. Data from the S1 electrode disc, optional auxiliary input signal and temperature signal from a QTP1 PAR/Temperature probe sensor are plotted as a chart recorder emulations in realtime with post-measurement data analysis tools included within the program. Completed experiments are saved in .CSV (Comma Separated Values) format which then may be opened directly in other Windows® data analysis applications such as Excel®.

Technical Specifications

OXYL1 Oxylab Electrode Control Unit

Measuring Range:	0 - 40% oxygen
Min. O₂ Resolution:	10 x 10 ⁻⁶ μmols/ml at 20 °C
Magnetic Stirrer:	150 - 900 rpm
Polarising Voltage:	700 mV
Gain:	Up to x50 (10 bit resolution)
Back off:	12 bit resolution
Integral Test Resistor:	Yes
Acquisition Rate:	0.2 - 10 readings/s
Signal Inputs:	Electrode disc, Aux., QTP1 probe
Communications:	RS232. USB via HAN/USB adapter
Dimensions (w x d x h):	250 x 126 x 65mm - 650g
Power Supply:	95 - 260V universal input mains supply. Output 12V DC 2.5A

DW2/2 Oxygen Electrode Chamber

Suitability:	Liquid-phase respiration/ photosynthesis
Construction:	Black acetel
Sample Chamber:	Precision bore, borosilicate glass tube
Sample Volume:	0.2 - 2.5ml (min. 1.5ml if illuminated)
Optical Ports:	4 optical port (16mm dia)
Temperature Control:	Water jacket connected to circulating water bath
Dimensions (w x h):	65 x 105mm - 100g

S1 Oxygen Electrode Disc

Electrode Type:	Clark type polarographic oxygen sensor
Electrode Output:	1 μA at 21% O ₂
Residual current:	Typically 0.02 μA in 0% O ₂
Response Time:	10 - 90% typically < 5s
Oxygen Consumption:	Typically < 0.015 μmol hr ⁻¹

LED1/W White LED Light Source

Lamp Type:	1 x white LED
Power Supply:	Powered by Oxylab oxygen electrode control unit
Intensity Adjustment:	Automatic intensity control via Oxylab oxygen electrode control unit & software
Dimensions:	64 (dia) x 60 mm (h)
Weight:	270g
Max. Intensity:	2000 μmol m ⁻² s ⁻¹ in DW2/2. Higher intensities possible using up to 3 x LED1/W

QRT1 PAR/Temperature Sensor

Measuring Range:	0 - 50000 μmol m ⁻² s ⁻¹ (+/- 5%) in 2 ranges (0 - 5000 and 0 - 50000) in 400 - 700nm band
Resolution:	1 μmol m ⁻² s ⁻¹ at 0 - 5000, 10 μmol m ⁻² s ⁻¹ at 5001 - 50000
PAR Sensor:	Silicon photodiode/optical filter combination with white acetel diffuser (7mm dia)
Temperature Sensor:	RT curve matched bead type thermistor. 0 - 50°C/32 - 122°F. 0.02°C resolution
Signal Display:	Handheld display unit. 16 x 2 LCD display. 0 - 5V analogue output of PAR/ temperature values
Power Requirement:	4 x 1.5V AA (LR6) cells. Typically 100 hours battery life
Dimensions Display:	146 (h) x 92 (w) x 32mm (d).
Weight:	300g (including batteries).
QTP1 probe:	9.5 (dia.) x 107mm (length).
Weight:	50g

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